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altogether. Jacobi's paper¹ convinces me I was in error as to *that* -proof of the existence of a state of tension in the metals before contact (650, 691). I need not therefore do more at present than withdraw my own observations.

795. I now proceed to address myself to the general argument, rather than to particular controversy, or to the discussion of cases feeble in power and doubtful in nature; for I have been impressed from the first with the feeling that it is no weak influence or feeble phenomenon that we have to account for, but such as indicates a force of extreme power, requiring, therefore, that the cause assigned should bear some proportion, both in intensity and quantity, to the effects produced.

796. The investigations have all been made by aid of currents and the galvanometer, for it seemed that such an instrument and such a course were best suited to an examination of the electricity of the voltaic pile. The electrometer is no doubt a most important instrument, but the philosophers who do use it

copper
Fig. 64.

are not of accord in respect to the safety and delicacy of its results. And even if the few indications as yet given by the electrometer be accepted as correct, they are far too general to settle the question of, whether contact or chemical action is the exciting force in the voltaic battery. To apply that instrument closely and render it of any force in supplying affirmative arguments to either theory, it would be necessary to construct a table of contacts, or the effects of contacts, of the different metals and fluids concerned in the construction of the voltaic pile, taken in pairs (856), expressing in such table both the *direction* and the *amount* of the contact force.

797. It is assumed by the supporters of the contact theory, that though the metals exert strong electromotive forces at their points of contact with each other, yet these are so balanced in a metallic circuit that no current is ever produced whatever their arrangement may be. So in fig. 64, if the contact force of copper and zinc is 10 \rightarrow -, and a third metal be introduced at *m*, the

effect of its contacts, whatever that metal may be,
with the zinc
¹ *Philosophical Magazine* ^ 1838, xiii. 401.